

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Loeppert et al. (US 5,870,482).

Regarding claim 1, Loeppert'482 teaches an acoustic diaphragm having a dynamic response extending through the audible range, and comprising a rigid plate-shaped member (12, 16, figures 1, 1a). Loeppert'482 teaches a stiffened edge (12a, 60) of a side of the rigid plate-shaped member which pivots on torsional springs (figures 1, 1a, 13 and see col. 3, lines 45-48). The rigid plate shaped member has torsional and translational stiffeners (32, 62, 62a, 68) as claimed (figure 1a, 13, 13a, 13c, 13d, 17a, 17b, col. 5, lines 1-31, col. 7, lines 49-55, col. 8, lines 39-43 and col. 10, lines 15-26) as claimed. Since the diaphragm (12) is anchored to a support structure (11) at a fixed edge (12a) and free on the other three edges, the diaphragm (12) is pivotally mounted to the support structure (11) at the fixed edge or stiff edge (12a), wherein the stiff edge (12a) of the diaphragm (12) is supported on torsional springs (also see col. 5, lines 1-21). Loeppert'482 further teaches the resonant frequency of the rigid plate-shaped member being substantially dependent on at least a set of physical characteristics of the stiffened edge as claimed (figures 1a, 6a, 6b, 7a, 10, 13, col. 5, lines 1-35).

Regarding claim 2, Loeppert'482 teaches the torsional and translational stiffeners comprising cross members (32) traversing the rigid plate-shaped member (12).

Regarding claims 5 and 6, Loeppert'482 et al. shows the rigid plate-shaped member (12, 16) that comprises a substantially flat shape or a shape substantially corresponding to a box as claimed (figures 1, 1a, 13, 17).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 7-10, 19, 20 and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert et al. (US 5,870,482).

Regarding claims 7, 8, 25 and 26, Loeppert'482 does not specifically disclose the thickness of the rigid member and the dimensions of the torsional and translational stiffeners as

claimed. However, Loeppert'482 does teach a construction of miniature silicon condenser microphone (col. 1, lines 7-9).

Since Loeppert'482 does not restrict to the size of the miniature condenser microphone; it therefore would have been obvious to one skilled in the art to provide any thickness and dimensions for the rigid plate-shaped member (12, 16) and the stiffeners (32, 62, 62a, 68) such as providing the rigid plate-shaped member having approximately 2 microns thick and providing the stiffeners having approximately 4 microns thick and 40 microns tall for the desired resonant frequencies.

Regarding claims 9-10, Loeppert'482 does not specifically disclose the first and second resonance frequencies as claimed.

Since Loeppert'482 does not restrict to the applications for the acoustic transducer; it therefore would have been obvious to one skilled in the art to provide the acoustic transducer of Loeppert'482 to be used in any applications such as transducers or sensors having the resonance frequencies of approximately 24 kHz or 84 kHz for greater applications.

Regarding claims 19, 27 and 28, Loeppert'482 teaches an acoustic diaphragm having a dynamic response extending through the audible range, and comprising a plate-shaped member (12, 16, figures 1, 1a) cantilevered about one side thereof from a stiff edge (12a, 60). The stiff edge (12a, 60) is pivotally supported by torsional springs (figures 1, 1a, 13; see col. 3, lines 45-48 and col. 5, lines 1-21). The rigid plate shaped member has torsional and translational stiffeners (32, 62, 62a, 68) as claimed (figure 1a, 13, 13a, 13c, 13d, 17a, 17b, col. 5, lines 1-31, col. 7, lines 49-55, col. 8, lines 39-43 and col. 10, lines 15-26).

Loeppert'482 does not specifically disclose a dynamic response as claimed. However, Loeppert'482 does not limit the frequency range or restrict to the applications for the acoustic transducer; it therefore would have been obvious to one skilled in the art to provide the acoustic transducer of Loeppert'482 a dynamic response dominated by a single mode of vibration outside of the audible range and to be used in any applications such as transducers or sensors having the resonance frequencies of approximately 24 kHz or 84 kHz for greater applications.

Further, the plate-shaped member (12, 16) has a resonant frequency or the dynamic response which is substantially dependent on the stiffed edge structure as claimed (figures 1a, 6a, 6b, 7a, 10, 13, col. 5, lines 1-35).

Regarding claim 20, as broadly claimed, Loeppert'482 teaches the torsional and translational stiffeners comprising continuous cross members (32, 62) as claimed.

Regarding claims 23 and 24, Loeppert'482 et al. shows the rigid plate-shaped member (12, 16) that comprises a substantially flat shape or a shape substantially corresponding to a box as claimed (figures 1, 1a, 13).

5. Claims 4 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert et al. (US 5,870,482) in view of Loeppert et al. (US 6,535,460).

Regarding claims 4 and 22, Loeppert'482 does not specifically teach the rigid plate-shaped member (12, 16) being fabricated of the material as claimed. However, providing the diaphragm, the fixed or back plate and the support structure in a silicon condenser microphone is fabricated of polycrystalline silicon is known in the art.

Loeppert'460 et al. teaches that the diaphragm and the support member are fabricated of polycrystalline silicon (col. 2, lines 53-62 and col. 3, lines 53-62).

Therefore, it would have been obvious to one skilled in the art to provide the rigid plate-shaped member (12, 16) being fabricated of polycrystalline silicon, as taught by Loeppert'460, for an alternate choice.

Allowable Subject Matter

6. Claims 11-18 have been allowed.
7. Claims 3 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments filed 03/08/10 have been fully considered but they are not persuasive.

Responding to the arguments about the limitation of the stiffened edge or the stiff edge structure in claims 1 and 19, the Applicant should note that Loeppert'482 does teach the resonant frequency or the dynamic response of the rigid plate-shaped member being substantially dependent on at least a set of physical characteristics (such as the set of the corrugations, the corrugation patterns, the dimension of the capacitor gap, the dimension of the corrugations and

the adding layers on the diaphragm) of the stiffened edge or the stiff edge structure as claimed (figures 1a, 6a, 6b, 7a, 10, 13, col. 5, lines 1-35).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUYEN D. LE whose telephone number is (571) 272-7502. The examiner can normally be reached on 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, CURTIS KUNTZ can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUYEN D. LE/
Primary Examiner, Art Unit 2614

HL
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